

5 CLAIMS

1. A device for non-contacting measurement of a length of an object to be measured, in particular a non-abraded length of a sliding contact brush,
10 comprising:
 - a pump for producing a variable pneumatic pressure, preferably an oscillating pressure;
 - a pressurized air line connecting the pump to a nozzle provided in the vicinity of the object to be measured, so that pressurized air from the pump flows through the pressurized air line and the nozzle onto the object to be measured;
 - at least one pressure sensor or flow sensor for determining changes of pressure or flow in the pressurized air line; and
 - a measuring amplifier or an evaluation circuit connected to the pressure sensor or flow sensor for evaluating signals from the pressure sensor or flow sensor, by means of which amplitudes of fluctuations of measured air pressure and preferably a difference between maximum and minimum air pressure are evaluated.
- 25 2. A method for non-contacting measurement of path lengths, comprising the steps of:
 - producing pressurized air having a fluctuating air pressure by means of a pump;
 - supplying pressurized air having the fluctuating air pressure via a pressurized air line and a nozzle to an object to be measured;
 - evaluating fluctuations of the fluctuating air pressure by means of a pressure sensor;

- processing signals from the pressure sensor by means of an amplifier or evaluation circuit, taking account of pressure fluctuations; and
- reading out measurement results of the pressure fluctuations.

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3. A device for determining the length of at least one contact brush in a sliding contact track system or collector system, comprising:

- a source of pressurized gas;
- means for supplying pressurized gas from the source to the at least one contact brush;
- at least one pneumatic sensor mechanically connected to the at least one brush;
- means for supplying the pneumatic sensor with pressurized gas from the source of pressurized gas; and
- an evaluation unit for evaluating signals from the pneumatic sensor indicating a pressure drop of the pressurized gas, the pressure drop representing a measure of a length of the brush.

4. A device according to claim 3, wherein at least one pneumatic sensor is connected via levers and rod linkages to the brush to be monitored.

5. A device according to claim 3, wherein at least one pneumatic sensor is incorporated in a brush holder adapted to receive the brush.

6. A device according to claim 5, wherein at least one pneumatic sensor comprises at least one flow passage extending parallel to a brush, a length and/or cross-section of the flow passage being changed according to a position of the brush.

7. A device according to claim 5, wherein a lateral bore is provided on at least one pneumatic sensor, the bore being normally covered or obstructed by the brush

and normally uncovered or unobstructed only when the brush exhibits a certain extent of wear, so that gas can escape through the bore.

8. A device according to claim 3, wherein for transfer of pneumatic signals from
- 5 pneumatic sensors, optionally at least one sensor is provided which is optionally designed to be a pressure sensor or a flow sensor.
9. A device according to claim 3, wherein a plurality of pneumatic sensors are connected to a pressure source by means of a manifold.
- 10 10. A device according to claim 9, wherein the manifold has a switching function for selective supply of pressure to particular pneumatic sensors.
11. A device according to claim 3, wherein the pressure source is adapted to be actuated by a clock.
- 15 12. A device according to claim 3, wherein the pressure source is designed to emit pressure pulses.
13. A device according to claim 3, wherein the entire pneumatic system is
- 20 adapted to be purged with gas under increased pressure.
14. A device according to claim 3, wherein a mechanism is provided for adjusting an entire height of a brush block comprising a plurality of brushes according to signals of pneumatic sensors.
- 25 15. A method for determining the length of at least one contact brush in a sliding contact track system or collector system, comprising the steps of:
 - feeding a gas into a pneumatic sensor which is preferably integrated into a brush holder for accommodating the at least one contact brush; and
 - 30 measuring a volume or velocity of gas flowing through the pneumatic sensor, or determining a pressure drop of the gas.